The role of Ontologies in electronic Institutions and reusable knowledge components

Josep Lluís Arcos
IIIA - Artificial Intelligence Research Institute
CSIC - Spanish Council for Scientific Research
Campus UAB, 08193 Bellaterra, Catalonia, Spain.
arcos@iiia.csic.es

1. INTRODUCTION

The purpose of this position paper is to briefly present the current research about ontologies in agent systems at the IIIA. We are mainly working in two different research topics: the role of ontologies in electronic institutions and the role of ontologies in reusable knowledge components holded by agents.

2. ELECTRONIC INSTITUTIONS

Intuitively, an electronic institution is the computational realization of a set of explicit enforceable restrictions imposed on a collection of dialogical agents that concur in space and time to perform a finite repertoire of satisfiable actions [1, 5].

An electronic institution, defines the legal interactions among agents, which we call scenes, with well-defined interaction protocols, and with a collection of domain ontologies for the message contents. One of the research aspects relevant from the ontology perspective is the capabilities provided in the specification of institutions for enforcing specific behaviors of agents in the institution. That is, we cannot specify only a collection of interaction of interaction and a collection of domain ontologies. We want to enforce in the institution that some specific message content sent by agents impose restrictions on dialogic actions of agents in the scenes they will act in the future. For instance, when an agent is selling a specific good, the good delivered to the customer will be the same that is selling.

3. THE IBROW PROJECT

The goal of the IBROW[1] project is to develop intelligent brokers that are able to distributively configure reusable components into knowledge systems through the World-Wide Web. Specifically, we are developing the WIM multiagent architecture, a web mediation service for looking for medical information.

In the IBROW project we are investigating two kinds of knowledge components: problem-solving methods (generic algorithms) and ontologies (generic domain knowledge). Because problem-solving methods (PSMs) are designed as reusable components, they are specified using an ontology independent of specific domain problems using the UPML framework[2]. Here the research is focused on the use of ontologies for defining *tasks* and *problem-solving Methods* [3], and the collection of *bridges* for providing mappings between the PSMs ontologies and the domain ontologies [4].

[1] IBROW stands for "Intelligent Brokering Service for Knowledge-Component Reuse on the World-Wide Web"

Acknowledgements

The research reported in this paper is partly supported by the spanish project e-INSTITUTOR (TIC2000-1414) and the european IBROW project (ESPRIT IST-1999-19005).

4. REFERENCES

[1] M. Esteva, J. A. Rodríguez-Aguilar, C. Sierra, and J. L. Arcos. On the formal specification of electronic institutions. In F. Dignum and C. Sierra, editors, *Agent Mediated Electronic Commerce*, number 1991 in Lecture Notes in Artificial Intelligence, pages 126–147. Springer-Verlag, 2001.

[2] D. Fensel, V. R. Benjamins, M. G. S. Decker, R. Groenboom, W. Grosso, M. Musen, E. Motta, E. Plaza, G. Schreiber, R. Studer, and B. Wielinga. The component model of upml in a nutshell. In *Proceedings of the International Workshop on Knowledge Acquisition KAW'98*, 1998.

[3] D. Fensel, S. Decker, E. Motta, and Z. Zdrahal. Using ontologies for defining task, problem-solving methods and their mappings. In *Proceedings of European Knowledge Acquisition Workshop (EKAW'97)*, Lecture Notes in Artificial Intelligence. Springer-Verlag, 1997.

[4] A. Gomez and V. Benjamins. Overview of knowledge sharing and reuse components: Ontologies and problem-solving components. In *Proceedings of the IJCAI'99 workshop on Ontologies and Problem-Solving Methods*, 1999.

[5] E. Plaza, J. L. Arcos, P. Noriega, and C. Sierra. Competing agents in agent-mediated institutions. *Personal Technologies*, 2:212–220, 1998.